Cost-Effectiveness Analysis of Neoadjuvant v Surgery-First for Resectable Pancreatic Cancer

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Background

- Neoadjuvant therapy for resectable pancreatic cancer is controversial
- Current guidelines support resection followed by adjuvant therapy.
- However, up to 50% of patients fail to receive adjuvant therapy due to:
  - post-operative complications
  - early disease reoccurrence
  - decline in function.
- Benefits of neoadjuvant therapy include:
  - elimination of micrometastases
  - Increased multimodal treatment obtainment
  - Increased R0 resection rates
  - Filtering patients with more aggressive tumours away from expensive, high risk surgery that would ultimately be futile.
- Risks of neoadjuvant therapy: losing window of resectability
- No large multicentre randomized controlled trials offering head-to-head comparison of treatment strategies

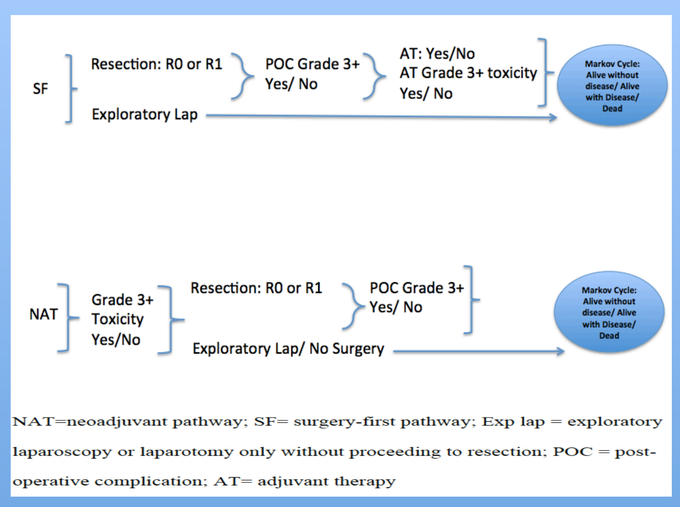
Aims

- To analyse the cost-effectiveness of neoadjuvant therapy (NAT) versus surgery-first (SF) treatment pathways for resectable pancreatic cancer.

- **Primary and secondary outcome measures:** Benefits were measured as QALMs with cost-effectiveness presented as incremental costs, incremental effectiveness, cost-effectiveness ratio, incremental cost-effectiveness ratio and incremental net monetary benefit.

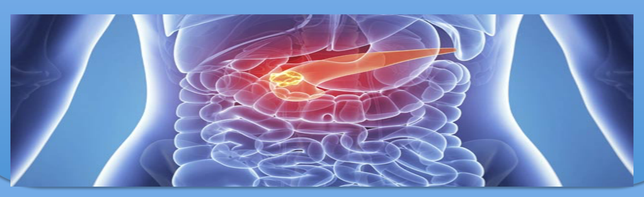
Methods

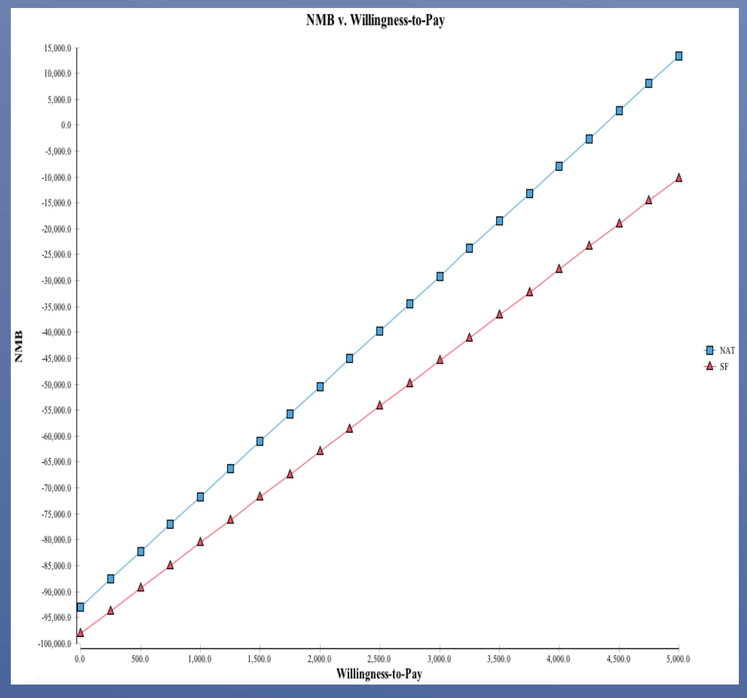
- The study was conducted from a National Health Service (UK) perspective
- Discounting of costs and benefits set at 3.5%
- Willingness-to-pay set at £2,500 per quality-adjusted-life-month (QALM) (£30,000 per quality-adjusted-life-year)
- A Markov model with 1-month cycle length set to a maximum follow-up time of 60-cycles was created to estimate incremental lifetime costs and benefits. Deterministic and probabilistic sensitivity analysis was undertaken to test model uncertainties including alternative discounting rates.



NAT=neoadjuvant pathway; SF= surgery-first pathway; Exp lap = exploratory laparoscopy or laparotomy only without proceeding to resection; POC = post-operative complication; AT= adjuvant therapy

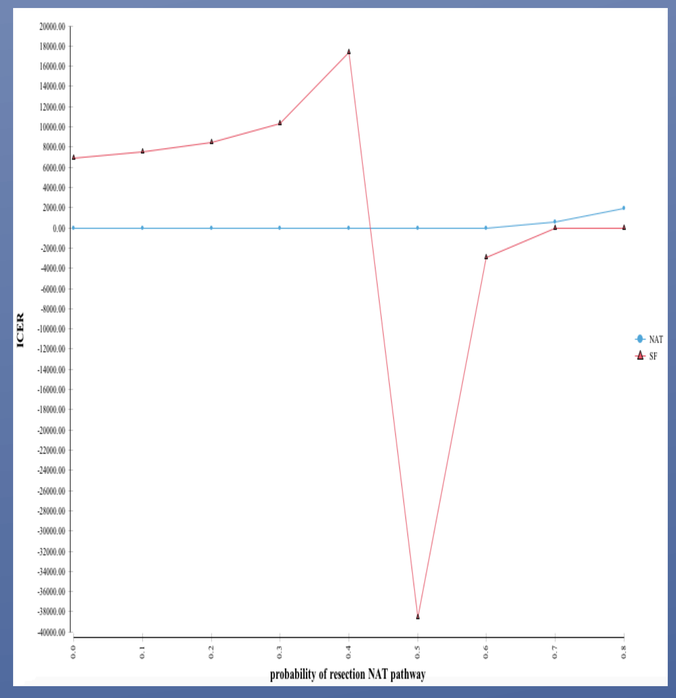
In the absence of large randomized controlled trial, model transition probabilities were calculated from meta-analysis of weighted pooled proportions following comprehensive search of MEDLINE, Embase, PubMed and Cochrane database and Cochrane database of Clinical Trials, RCTs, phase II and III trials.





Results

NAT gave 21.27 QALMs at a cost of £92957.30 with a cost-effectiveness ratio of £4370.73. SF gave 17.59 QALMs at a cost of £98188.63 and a cost-effectiveness ratio of £5582.85. SF therefore had an incremental cost of £5231.33 more than NAT for an incremental effectiveness of -3.68 QALMs and an incremental cost-effectiveness ratio of -£1421.33 making NAT the most cost-effective option.



Message For Others

Cost-effectiveness analysis adds an important dimension to the debate about competing treatment options for resectable pancreatic cancer. Costs and benefits In cancer treatment are multifaceted and complex requiring greater patient and carer input in future research which should coincide with a move towards personalised predictive medicine in research to support shared clinical decision-making.

Conclusion

Based on best available current evidence we found that NAT is cost-effective for the management of resectable pancreatic cancer.

However, as high-quality data from emerging RCTs becomes available further cost-effectiveness analysis is required.

There remains the possibility that patients with earliest resectable disease most likely to receive R0 resection and adjuvant therapy may still benefit from upfront surgery approach

Future Direction

Quality-of-life data for pancreatic cancer is limited and this should be the focus of further research as costs and benefits in cancer care are complex with quality as well as quantity of survival time having great importance. Although neoadjuvant pathway was more cost-effective, this depended on receiving multimodal treatment. This highlights the need moving towards personalised predictive medicine to support shared decision-making in research and practice.